CHAPTER TWO

INDUSTRIAL SICKNESS : A CONCEPTUAL FRAMEWORK

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For conceptual framework on the issue of industrial sickness, this chapter deals with the concept, process, stages, signals & symptoms, diagnosis and consequences of industrial sickness. The chapter also presents some common causes and remedial measures alongwith various predictive models of industrial sickness developed earlier.

2.1 Concept of Industrial Sickness

Before analyzing the industrial sickness it is better to define the word 'industry' and 'sickness'. Within the framework of the Industrial Policy-1991 the following activities have considered as industries [MOI; 1991].

(a) Manufacturing, assembling or preparation of any product through mechanical process;
(b) Extraction of any mineral and natural resources through mechanical means;
(c) Construction industry, hospital and clinic, hotel and tourism and other service-oriented industries;
(d) Technology-based fisheries, livestock and poultry, seed production and multiplication, and other farm-based activities;
(e) Handicraft and cottage industries; and
(f) Service or other activities which are accepted and recognized by the Government as industry.

Actually, 'Industry' is an entity which is engaged in any of the activities like manufacturing, processing, preservation and servicing. The industries may be broadly grouped under five heads, viz.

(i) Basic industries
(ii) Capital goods industries
(iii) Intermediate goods industries
(iv) Consumer goods industries and
(v) Service industries
A person is treated as ‘sick’ if any part of his body (system or subsystem) does not function normally. Similarly, if any functional area of an industrial unit (viz., production, marketing, finance, personnel and corporate management) develops any abnormality, the whole unit may become sick [Bidani & Mitra; 1982:17].

‘Industrial sickness’ is easy to understand but difficult to define. It has different meaning to different people. The workers may consider the unit as sick if they are not getting their wages in time. The management and shareholders may measure the sickness in terms of inadequate return on their investment and irregular dividend. The financial institutions/banks give importance to the repayment of their loans and unit’s ability to pay interest regularly. To an investor the industrial sickness is one which skips dividends. To an industrialist it means recurring losses and tottering on the brink of closure. So, the meaning of sickness is based on different norms such as generation of surplus, liquidity and solvency position, erosion of equity, the amount and the period of irregularities etc.

To define the term ‘industrial sickness’ is a problem because mainly definitions given by different sources depends on different purposes. No single definition will suit all the purposes.

The State Bank of India’s study team on small scale industrial advance (1975) defined industrial sickness as, "a unit which fails to generate adequate internal surpluses on a continuing basis and depends for its survival on frequent infusion of external financial help, thereby it brings about serious dis-equilibrium in its financial structures" [Sahu; 1990]. Thus the study group found that the industrial unit is sick when its internal capabilities are exhausted and it began to seek external financial help for its survival.

The study group set up by the Reserve Bank of India (RBI) to frame guidelines for follow-up of bank credit defined the industrial sickness as, “with a steady erosion of profitability, the borrower’s liquidity declines and the first sign of difficulty is delayed payments to creditors, leading ultimately to default. With further deterioration in profitability, followed by losses,
current liabilities exceed current assets; in other words, a net working capital surplus becomes a net working capital deficit" [Kaveri; 1983:23]. The team rightly paid emphasis on liquidity of a firm. It stated that the liquidity of a firm declines to meet the obligations of creditors when current liabilities exceed current assets and ultimately the unit becomes sick.

The Government of India enacted the Sick Industrial Companies (Special Provisions) Act (SICA) 1985, which defines sickness on the basis of continuous losses and complete erosion of the equity base of the unit. According to this Act, “an industrial company (being a company registered for not less than seven years) is as sick when it has at the end of any financial year accumulated losses equal to or exceeding its entire net worth and has also suffered cash losses in such financial year, and the financial year immediately preceding such financial year”. The aforesaid seven years has been changed to five years by an amendment of the SICA in December 1991.

Prof. Farooq defined industrial sickness as “the situation where the revenue of a firm are insufficient to meet the cost, and the rate of return on investment is less than firm’s cost of capital” [Khan, A.F; 1986].

The definition of sick units adopted by the term-lending financial institutions is based on the criteria of continuous cash losses, defaults in debt servicing requirements and irregularities in meeting statutory and other liabilities. Thus, an industrial unit is classified as sick by the term-lending institutions after taking into account any of the following symptoms: (i) continuous defaults in meeting four consecutive half yearly instalments of interest or principal in respect of the institutional loans; (ii) continuous cash losses for a period of 2 years or continued erosion in the net worth by 50% or more; and (iii) mounting arrears on account of statutory or other liabilities for a period of one or two years [Bidani & Mitra; 1983:19].

The National Institute of Bank Management (NIBM) defined sick units as “those where the operation result in continuous losses bring down the working capital available and ultimately affecting the borrowing potential almost permanently.”
Reserve Bank of India [RBI; 1988] defined (i) a unit may be considered sick, if it has incurred cash losses for one year and, in the judgement of the bank, it is likely to continue to incur cash losses for the current year as well as the following year, (ii) the unit has an imbalance in its financial structure such as current ratio is less than 1:1 and worsening debt-equity ratio i.e. the ratio of total outside liabilities to net worth; and (iii) when the cumulative losses exceed capital and reserves. Thus, the emphasis is the RBI’s definition of sickness is on profitability, liquidity and solvency.

Mr. Sudarshan Lal in his definition of sick unit has indicated two stages of sickness. According to him, “a unit can be considered sick if it is operating at less than break-even point, that is, where it is unable to meet its costs and depreciation, the unit, which has eroded its capital and reserves, should be considered to have reached an advanced stage of sickness” [Lal; 1979].

The Government of Bangladesh constituted ‘Sick Industries Rehabilitation and Revitalizing Cell’ in the Ministry of Industry in 1991. According to the cell, "An industrial unit: (a) which could not attain the normal production and profit level, (b) has incurred loss or remained at the unprofitable level for consecutive 3 to 6 years from the year of commencement of commercial production, or (c) could not produce above the break-even point (BEP) for the reasons beyond the control of the entrepreneurs would be considered as sick” [MOI; 1992].

Sickness in an industry means the same as sickness in a human body. It is an organic process in the life history of a unit. This may be attributed to fall in demand, technological obsolescence, statutory interference, excessive taxation, trade unionism and mis-management but the single reason which leads to maximum sickness is financial mis-management [Sen; 1989].

According to Bhaskar Banerjee “Sick Unit may be defined as one which fails to generate internal surplus on a continuing basis, which has not been able to finance even margin money for borrowing capital and where
part of the capital has been lost because of the losses already made” [Banerjee; 1979].

On the basis of above mentioned definitions, it may be concluded that an industrial unit may be considered sick if it does not perform primary functions like purchase, production, sales, collection and repayment of debts and dues satisfactorily. It is a unit which fails to generate internal surplus and continuously depends on external funds for its survival.

2.2 Process of Industrial Sickness

Industrial sickness does not occur all of a sudden in the life history of an industrial unit. In fact, it is a gradual process with distinct stages taking from 5 to 7 years to corrode the health of a unit. An industrial unit just like a human body. The human body [Bidani & Mitra 1982] is a healthy biological organism which, before it becomes sick, generally passes through various stages. If the sickness continues for a long period it may become chronic. In case no treatment is given at the initial stage, it may go beyond control and result in the death of the organism. Likewise, an industrial unit also passes through various stages before it becomes sick.

Sickness does not develop at once except due to accidents, natural catastrophies or other external factors causing heavy irrecoverable loss to the industry. In most of the cases, sickness is bred within the unit itself. A healthy unit may grow sick temporarily and recover or vice-versa. Factors that cause sickness in an industrial unit could be internal or external. The external factors generally affect all units in the same group while the internal factors affect a particular unit only.

According to NCAER, “Sickness is defined in terms of financial viability consisting of three independent elements of equal emphasis and weight, viz., profitability, liquidity and solvency represented by cash profit or loss; net working capital; and net worth respectively. When all these parameters show positive figures, the unit's financial viability will be sound and normal. Where one of them shows a negative figure, the unit could be
regarded as tending towards sickness; where two of them show negative figures, it would be a case of incipient sickness; where all of them show negative figures the unit may be termed as sick" [NCAER; 1986]. On the basis of the above definition, the organic process which generally passes through various stages of sickness in an industrial unit is illustrated in the following figure No. 2.1:

**Figure 2.1 : Organic Process of Industrial Sickness**

<table>
<thead>
<tr>
<th>Healthy Unit</th>
<th>Stage - I: Tending Towards Sickness</th>
<th>Stage - II: Incipient Sickness</th>
<th>Stage - III: Sick Unit</th>
</tr>
</thead>
</table>
| 1. Cash Profit/ Loss = '+$'
2. Net Working Capital = '+$'
3. Net Worth = '+$'
| 1. Cash Profit/ Loss = '−'
2. Net Working Capital = '−'
3. Net Worth = '−'
| Two or More '−'
| All '−'

From the above figure it is evident that in healthy stage, the key parameters like cash profit, net working capital and net worth are positive values. As it tends towards sickness, the parameter cash profit may become negative but the unit will still continue to pay its instalments to the term-lending institutions, when it moves towards higher intensive zones, two or more financial parameters may become negative. At this juncture, the financial analyst or the financing agency should review the overall situation and take appropriate corrective measures to prevent the unit from becoming sick. If the above trend is not arrested, this will lead to total failure or closure of the unit.

Bidani & Mitra explained the process of industrial sickness in a different way [Bidani & Mitra; 1982:23]. A unit is called normal when all its functional areas like production, marketing, finance and personnel are functioning efficiently. In other words, it is earning profits, the current ratio is more than one, net worth is positive and debt-equity ratio is good, it can be declared healthy. It also indicates that, the management are doing well. If the unit tends towards sickness and shows some signals, then some appropriate preventive measures can be considered after going into the various causes of unsatisfactory functioning. If the deterioration in the
functional areas continues, it may result in the actual setting in of sickness i.e. incipient sickness is a stage where the unit incur cash losses but imbalance in the financial structure may not be apparent. At this stage, a banker should review the overall situation and take suitable corrective measures to prevent the unit from becoming sick. Actually, the best time for corrective action is when the sickness is at the incipient stage. If corrective measures are either not taken or are inadequate at the incipient stage and the causal factors continue to adversely affect the functional areas, the unit finally becomes sick.

An understanding of the process of sickness can help in its timely detection and corrective action. Any delay treatment at early stages can lead to the unit becoming gravely sick. In such a stage, the treatment may be far more costly and time consuming. So it can be said that, if the problem is detected at an early stage, corrective measures can be taken easily and effectively. This would help in tackling the grave consequences.

2.3 Stages of Sickness

An industrial unit may become sick at any time from the date of establishment. There are various reasons for sickness at different stages.

(a) *Sickness in the Project Formulation Stage*: A project may be sick before sanction and disbursement of loan and establishment as industrial unit. This may be due to faulty product selection, wrong location, dependence on foreign collaboration, false investment decisions and conflict among the entrepreneurs etc. Here, if the situation is beyond control, it is justifiable to close the project because of low risk and cost involvement.

(b) *Sickness in the Project Implementation Stage*: A unit may become sick in the project implementation stage i.e. before commencement of operations. This may be due to installation of defective machinery, failure to bring promoter’s contribution or the share of financial institutions, complexity in obtaining capital etc. Some appropriate preventive measures are required to save the unit from going to the next stage of sickness.
(c) **Sickness is First Production Stage**: A unit may be sick after the commencement of commercial production but before starting of marketing operations. This may be due to accident in factory, major defect in plant & machinery, defect in production planning, inadequate working capital, liquidity crunch etc. At this stage management should pay more attention and take corrective action.

(d) **Sickness in Marketing Operation Stage**: A unit may become sick just after starting of marketing operations. This may be due to easy availability of similar goods in the market, inefficiency in marketing strategy, shortage of raw materials, power failure etc. At this stage management should remain aware of the overall situation and take suitable corrective measures to prevent the unit from becoming real sick.

(e) **Sickness in Fully Operations Stage**: This is the final stage of sickness. After the commencement of commercial operations and marketing, if corrective measures are not taken the situation adversely affect the functional areas of the unit and ultimately it finally becomes sick. This may be due to easy availability of similar goods at a cheaper price, sudden change in the government policy, natural disaster, increase in the cost of raw-material, power, labour etc., shortage of working capital, unfavourable labour laws and adverse industrial relations, mis-management, frequent breakdown of plant & machinery, change in demand of customers etc.

An understanding of the various stages of industrial sickness with various financial characteristics can help in its timely detection and corrective action.

2.4 **Signals and Symptoms of Industrial Sickness**

Industrial sickness is a time phenomenon, all of a sudden an industrial unit does not become sick unless there is a major accident, or catastrophe, causing heavy irrecoverable loss to the units. Normally sickness does not set in overnight or develop all at once. It is a gradual process which corrodes the units in several stages. It shows some signals & symptoms of weakness
and if they are not removed, they get settled.

The warning signs in several functional areas are termed as signals; Normally, in the initial stage, the management of an enterprise does not pay heed to the early warning signals of sickness but they become aware and serious only when the sickness is in the advanced stage. In fact, the timely identification of various signals makes the detection of sickness easier. Therefore, the various signals need to be identified and monitored at an early stage of sickness.

The signals which are persistent/neglected over a long period of time, become symptoms of sickness. The symptoms are the initial red signals which if identified in the incipient stages, could avert the units from sickness and divert them towards improvement.

The symptoms of an industry's sickness are first noticed by the management. Subsequently they are observed by others like employees, creditors, customers and the government. It is also a point to remember that no one symptom by itself would be an indicator of weakness and it is only when several of these factors appear simultaneously, there should be a cause for enquiry. Some sick units are born in sickness, some live in sickness and some die in sickness. To diagnose whether sickness exists or not in an industrial unit, there are a number of signals/symptoms which may be as follows:

1. Continuous shortage of cash;
2. Deteriorating financial ratios;
3. Frequent requests for loans to DIFs and banks, i.e. heavy dependence on external funds;
4. Delay in the audit of annual accounts;
5. Failure to pay statutory dues to employees, creditors, financial institutions and banks;
6. Morale degradation of employees and desperation among the top and middle management level;
7. Sudden/frequent changes in the management and rapid turnover of key
personnel and/or dominated by one man/few individuals;

(8) Continuous cash losses;

(9) Higher rate of rejection of goods manufactured and increase in customer complaints;

(10) Decrease in working capital on account of:
(a) increase in debtors and particularly dues from selling agents,
(b) decrease in creditors due to falling market reputation,
(c) increase in inventories which may include large number of slow or non-moving items,

(11) Frequent breakdown of plant and Machinery;

(12) Non-submission/delayed/incorrect submission of stocks/book debts statements and other control statements to banks, financial institutions and corporations;

(13) Frequent dishonour of bills/delay in retirement of bills/return of bills;

(14) Requests for reduction in margin or over-valuation of stocks;

(15) Existence of a large number of law suits against the industrial unit;

(16) Continuous fall in sales, market share and collection of inventories;

(17) A general decline in that particular industry;

(18) Frequent labour unrest/disputes;

(19) Decline in capacity utilization/stoppage of production;

(20) Reduction in credit summations wherever the companies are in financial difficulty, they open a separate account with another bank and deposit all collections therein [Goiporia 1989];

(21) Shortage/non-availability of raw materials, electricity, gas, water, technical personnel & labour;

When the signals are noticed and symptoms are exhibited, it is necessary to analyzes the trends of these signals and symptoms for determining the level of sickness in the light of their nature.

Sources of Signals and Symptoms

For early detection of signals and symptoms of industrial sickness, it is important to know its sources. Generally, the information on early
warning signals can be obtained from two sources, viz., internal and external. The most relevant source of symptoms of sickness is internal i.e. operating results of the unit. Internal sources include ledger data, stock statements, factory visits, discussion with borrowers and analysis of financial statements. External sources of early warning signals include market reports, press reports, other firms dealing in the same industry and the transacting banks. To get signals of industrial sickness and then take appropriate preventive action, it is essential to use certain techniques with some important information. Sources of such information are stock statement, ledger data, quarterly operating statements, market reports, financial statements, funds flow and cash flow statements [Kaveri; 1983].

2.5 Diagnosis of Sickness

Before a policy is evolved and successfully implemented to deal with the problem of industrial sickness, it is absolutely necessary to have a correct diagnosis of the problem. If factors that are responsible for causing industrial sickness are correctly diagnosed, it will be possible to prevent the sickness in the initial stage itself. Actually, the diagnosis is invariably the first step in the process of treatment, but before undertaking a study on diagnosis, it is essential to know the different causes of industrial sickness. The causes/problems of sickness are numerous. One single reason for sickness, if not effectively controlled, may create some new problems resulting in chronic sickness or closure of the unit. A sick unit brings causes much hardship in terms of production disruption, loss of employment and income. "Prevention is better than cure", so in order to prevent the incidence of sickness, it should be properly diagnosed at an early stage through its financial and non-financial symptoms.

The approach of Reserve Bank of India (RBI) to diagnose industrial sickness has two criteria. They are: (1) cash losses of the previous year, the current year and anticipated for the next year and (2) the deteriorating debt-equity ratio. In order to diagnose the process of sickness of an industrial unit, the cash profit, net working capital and net worth are the important
indicators/financial symptoms which distinguished a healthy unit from a sick one.

Non-financial symptoms are also distinctly marked in case of a sick unit. Low morale of management and employees, deterioration in the quality of product or raw materials are supplies, resistance to pay increase and other benefits indicate the depressing climate of a failed unit. If the diagnostic study reveals that the factors of sickness are uncontrollable and the unit is incurable i.e. beyond revival, than it is most justifiable to close it down without spending any more amount of money on it, on the other hand, nursing programme may be taken for which units are potentially viable. So it is necessary to undertake proper diagnosis of the root causes of sickness of an industrial unit through a thorough examination and review of the operations almost from its very inception.

2.6 Consequences of Industrial Sickness

The main consequences of industrial sickness on an economy have been locking up the country's limited financial resources, loss of production, wastage of capital assets, reducing employment potential and centralizing industrial base. Thus, the main consequences of industrial sickness can be summarized as follows:

(i) **Huge Financial Losses to the Banks and the Financial Institutions:** Industrial sickness to the banks and financial institutions is the question of sinking large funds and valuable assets remaining idle. The effect of the problem on banks and financial institutions is to make their operation less productive. Profitability of banks is eroded by writing off interest and loan, revenue losses due to reduced interest rates and non-availability of funds. Thus, these all bear an adverse effect on the financial health of the banks and the financial institutions.

(ii) **Loss of Employment:** One of the serious consequences of industrial sickness has been loss of employment, income generation and thereby aggravating the most dangerous socio-economic problem of unemployment in a labour
surplus economy like Bangladesh. Workers lose jobs on account of closure of sick units with the result that the economy bears additional problem of unemployed labour force.

(iii) **Reduction of Export Earnings**: There will be a reduction in earning of foreign exchange in the unit falling sick on account of sale of its finished products abroad.

(iv) **Misutilization of Institutional Funds**: The sickness in any sector on account of this factor results ultimately in stagnation of capital investment which is a scarce factor in the developing country like Bangladesh.

(v) **Emergence of Industrial Unrest**: The closure of particularly large sick industrial units employing a large number of workers causes not only unemployment, but the trade unions of both sick and non-sick units opposed it and resorted to widespread industrial strikes ultimately leads to industrial unrest.

(vi) **Adverse Effect on the Prospective Investors and Entrepreneurs**: Due to sickness, the share price of the unit tumbles down which adversely affects the stock market of the country. In this way, the growing phenomenon of industrial sickness reduce the confidence and trust in the entrepreneurs and creates and psychology of despair for investments amongst the investors. Added to this, the failure and closure of a unit acts as an unhappy example of disincentive to the prospective entrepreneurs who are planning to plunge into the same lines of production. On the whole, the industrial climate becomes non-conductive for the industrial development of the economy.

(vii) **Increase in Social Evil**: Growing of industrial sickness indirectly increases in social crime among the unemployed youths, e.g. hijacks, drug addiction, morale turpitudes etc., from frustrations about life.

(viii) **Wastage of Scarce Resources**: In an slow developing country like Bangladesh, the resources are already scarce. If these scarce resources are invested in sick industries particularly in large scale sick industries where substantial investment has been made in plant and machinery, it becomes
the wastage of the scarce resources. Loss of production in sick units bears two adverse effects on the economy as a whole. Firstly, it results in a decline in production and secondly, it also blocks up valuable savings and capital equipments which otherwise invested would have yielded substantial returns to the economy [Khanka; 1995].

(ix) Loss of Contribution to the Public Exchequer: When a large number of industrial units becomes sick, the possibilities for raising substantial contribution from the sick units by way of various levies and VAT are greatly reduced. The shortage of revenue collection ultimately adversely affects the functioning of the economy as a whole.

(x) Repercussion of the other Industries: When an industry is affected, there are adverse repercussions on the other industries which may be supplying raw materials or may be consuming the end-products of the sick industry.

(xi) Adverse Effects on Politics: Industrial sickness leads to formation of pressure groups and parties for nourishing the sick industries and increase of foreign control on the country’s administration and affairs, particularly in formulation and implementation of industrial and commercial policies, fiscal administration etc.

Going through the various consequences of industrial sickness, now it can be concluded as, if the increasing trend of sickness is allowed to grow without taking preventive and curative measures, it will seriously impede the utilization of installed capacity, reduce output, block scarce capital, create further unemployment, increase in social crime, check further investment and tax revenue of the government.

2.7 Causes of Industrial Sickness

There are several causes of sickness and a unit could become sick due to one or in conjunction with other causes. The causes of sickness differ from industry to industry, area to area, size to size, product to product of the industrial units. They are innumerable and may range from improper
project planning and appraisal to internal disorders in the major functional areas of production, marketing, finance, personnel and management. Some external which may be called as environmental factors like social, economic & political conditions and Government legislation & control are also responsible for causing sickness to industrial units. Internal causes of sickness are those which are within the control of the industry. External or environmental factors on the other hand are those on which the unit has no control and are crucial at the same time in pursuing down the unit into sickness.

A good number of research studies have been conducted on this problem by various experts form time to time. Different experts on the subject have classified and reclassified the causes of industrial sickness in various ways according to the nature, scope and purpose of their respective studies. Whatever the purpose of the study, the following internal and external factors can be cited as some of the important causes for industrial sickness.

Some Common Causes of Industrial Sickness

A. Internal Causes :

1. Project Planning :
   - Inadequate technical know how
   - Locational disadvantage
   - Outdated production process
   - High cost of inputs
   - High break-even point
   - Uneconomic size of the project
   - Underestimation of financial requirement
   - Unduly large investment in fixed assets

2. Project Implementation :
   - Delays in getting licences/sanctions resulting cost escalation
   - Inadequate mobilization of finance
   - Dislocating suppliers of plant & machinery and placement of orders
   - Changes in project concepts by entrepreneurs/collaborators/consultants etc.
3. **Managerial:**
   - Lack of management expertise and supervising
   - No proper manpower development programme
   - Inability to maintain proper accounts
   - First generation entrepreneurs, mostly coming from trading activities with little or no experience
   - Lack of feedback / MIS
   - Over centralisation
   - Lack of adequate control
   - Dishonest management

4. **Technical:**
   - Wrong choice of location, location of industry far too distant from raw materials and customers
   - Improper layout of the plant
   - Working below installed capacity
   - Obtaining machinery without spares
   - Absence of modernization of the product
   - Lack of technically trained skills
   - Lack of modern machinery and technology

5. **Production:**
   - Poor quality of raw materials
   - Poor maintenance and replacement of machinery
   - Poor collection of power (gas, chemical, oil etc.) and other inputs
   - Delayed supplies from subcontractors
   - Obsolescence
   - Lack of product diversification
   - Improper planning for the life of the product
   - Poor quality control
   - High rate of wastage

6. **Marketing:**
   - Poor pricing system
   - Poor products and product mix
- Non-compliance with delivery schedule
- Lack of sales promotion
- Lack of sufficient advertisement
- Lack of sales planning and forecasting

7. **Financial**:
- Lack of finance and working capital
- Adverse debt-equity ratio
- Too much bad debts and uncollectables
- Underestimation of cost of product
- Lack of proper financial planning and control
- Continuous losses
- Diversification of working/loan capital to sister concerns, misuse of funds by investment in windfall trading

8. **Personnel**:
- Weak organizational set-up
- Poor labour relations resulting in strikes and lock outs
- Absenteeism/labour turnover
- Excessive manpower
- Dishonesty and lack of integrity
- High expectation and low labour productivity
- Lack of training
- Lack of motivation and job satisfaction

9. **Others**:
- Dishonesty of the entrepreneurs
- Quarrels among partners/shareholders

**B. External Causes**:

1. **Infrastructural Bottlenecks**:
- Inadequacy of essential inputs like power, fuel, water, transport etc.
- Inadequate supply of raw materials both quantitatively and qualitatively
- Non availability of spare parts, manpower etc.
2. **Financial Bottlenecks**:
   - Heavy financial burden due to Taka devaluation/foreign exchange rate fluctuations and accumulation of interests and debt servicing liability
   - Price rise of raw-materials, fuel, spare parts, power, water and other inputs
   - Fixation of loan instalments by the bankers/financial institutions without taking into account the gestation period
   - Non-availability of adequate funds

3. **Government Controls and Policies**:
   - Changes in the govt. Policies like export-import restrictions, increase in customs duty, sales tax, VAT, excise duty etc., hike in wages due to new policy, sudden withdrawal of subsidy, tax holiday, exemptions etc.
   - Easy availability of substitute/similar goods in the market through smuggling, illegal production and liberal imports
   - Government price control
   - Deterioration of law and order situation in the country
   - Dumping practices of multinational companies

4. **Market Constraints**:
   - Market saturation point
   - Sudden and wide fluctuations in the demand
   - Technological advances resulting product obsolescence

5. **Extraneous Factors**:
   - Sudden and ultimately death/departure/removal of a key person
   - Natural calamities like fire, flood, cyclone etc.
   - Political influence over the workers and patronage of unhealthy trade union practices leading to overmanning
   - Political situation (domestic as well as international)
   - Sympathetic strikes and closure of production
2.8 Remedial Measures of Industrial Sickness

In a competitive economy the problem of industrial sickness is likely to come up occasionally depending upon phases of business cycles. In advanced economies, survival of the fittest and weeding out of inefficient industrial units is a common feature. However, in a county like Bangladesh, the problem of industrial sickness cannot be left to the market forces because of its adverse repercussions on the economy as a whole. There are no social security measures to provide financial relief to unemployed persons. It is, therefore, important that measures should be taken to prevent incipient sickness among the industrial units, and also every care and precautionary measures should be taken to save the industry from future sickness. To check the growing phenomenon of sickness some remedial measures will have to be taken by all concerned viz., management itself, DFIs, the sponsors, the commercial banks and the Government. These remedial measures may be of two forms, viz., prevention of sickness and nursing schemes for rehabilitating sick industries. Both the types of remedial measures are discussed as under:

2.8.1 Prevention of Sickness

It is well established that “Prevention is better than cure”. Continuous use of the predictive models, either the traditional ratio analysis or the statistical models, by the management in assessing a firm’s health and taking necessary preventive steps to prevent any sickness of an industry getting worse. Besides the management, financial institutions like banks and term lending institutions and the government have also a significant role to play in preventing sickness. Among various preventive measures, the importants are: proper and unbiased appraisal of project, proper and adequate supervision, follow-up, reporting and monitoring of industries. The entrepreneurs have, also a vital role to play in all these exercises right from the selection of the project to their successful implementation and operation. In case, the sickness is noticed then some immediate steps should be taken to turnaround the sick industry into an economically viable one. Turnaround means 'a
substantial and sustained positive change in the performance of a business' [Bibeault; 1982]. Inclination towards sickness is warned by couples of signals before the industry goes through the incipient and advanced stages of sickness. Thus the concerned agencies should be vigilant not only during the implementation but thereafter also to give necessary timely guidance to the entrepreneurs/management. Similarly, concerned parties should ensure technical advice to the entrepreneurs/management during difficult time so that the weak industries be saved at the right time.

2.8.2 Revival and Rehabilitation of Sick Industries

The objective of rehabilitation is to restore the capacity of generating the internal surplus rather than immediately recovering the amount. Only such industries may be considered for revival or rehabilitation which have chances of becoming viable and would be able to dispose of all the outstandings including new funds raised for revival. To try to revive an industry which would remain permanently sick would ultimately prove to be highly costly to the national economy, unless there are compelling reasons to keep an industrial unit running on non-financial considerations. An opportunity for rehabilitation should be given only to those borrowers whose bonafides and character are beyond doubt and they are willing to cooperate because at the juncture the attitude of the borrower is very important [Reddy; 1988]. So, it is essential to prepare a thorough feasibility study prior to the undertaking of rehabilitation programme and carefully monitoring of the performance during the nursing period.

The main object of nursing is to cure the sickness of an industry for its revival/restoration/rehabilitation. Industrial sickness may be cured, by giving some reliefs and concessions to the sick industry, providing raw-materials on time, providing efficient marketing facilities for the marketing of the finished products, keeping a check on the managerial competence, allowing labour rationalization in cases where the industry is overstaffed, providing funds for modernization, if the state of sickness is not advanced, providing the help of technical/professional managers to sick industries,
exempting the sick industry from payment of excise duty, sales tax, increase
the tax holiday period etc. till the time the industry is in a better condition.

In order to rehabilitate potentially viable sick industries, concerned
parties formulate nursing programme to revive them and bring them to health.
In depth study is necessary to determine the new break-even point or the
viable level at which the sick industry will have to operate to generate
reasonable surplus, i.e., a surplus which will over a period of time wipe-out
the existing irregularities and build up adequate equity to meet normal
margins and allow gradual withdrawal of the special concessions if any,
granted to the industry. Actually, potentially viable industries can only be
taken under a nursing programme. Potentially viable industries are those
where situation is not completely out of control and the borrower also is
willing to cooperate and submit to the discipline laid down by the bank.

Having decided to nurse the industry, the bank/financial institution
has to undertake the follow-up activities. It is necessary to check the progress
of the nursing efforts from time to time. The following activities should be
performed here for monitoring the industry properly [Kavari; 1983:140] :

(a) Information System: For the purpose of nursing, necessary information
such as stock statements, monthly/quarterly budgets and actual figures for
production, sales, purchases, overhead expenditure etc., cash flow statements
balance sheet is asked frequently.

(b) Review of the Account: It is essential to know the performance of the
industry on regular basis through the review of the accounts.

(c) Monitoring the Areas of Weakness: After detecting the areas of
weakness, a detailed study of such areas would suggest the line of action
to be taken.

(d) Monitoring Meetings: There must be at least monthly meetings between
the borrower and the institutions to assess the progress of implementation.
Such meetings should review the progress achieved during the period. If any
adverse variances are observed, suitable corrective actions could be taken
up for review at these meetings.
(e) **End-use of Addition Funds**: Since the nursing programme usually involve outlay of additional funds, it is necessary to ensure that these funds are properly used for the purpose intended. This would enable the borrower to get timely payment from all concerned agencies.

(f) **Inspection/Visits**: The main aim is to ensure that all the assets are not only intact and well maintained but also to optimum use. During inspection, position in respect of physical stocks could be examined. A dialogue with few workers/staff sometimes give a lot of information about what is happening in the industry.

Careful monitoring of the performance during nursing programme of a sick industry back to health is indeed a very difficult task. For successful implementation of the nursing programme to rehabilitate the sick industry is a joint responsibility of banks / financial institutions, the government, labour and borrowers. If there are chances of recovery of health, the bank/rehabilitation agency will continue to nurse the industry. Even after a close follow-up, monitoring of key factors and active managerial support in rehabilitation, the sick industry do not show any improvement, and if there are no signs of recovery, the nursing programme should be concluded and necessary steps be taken to call-up that account.

Nursing is not a magic, it is hard exercise based on strict discipline, sincerity, efficiency and honesty. There should be coordination and cooperation on an on-going basis amongst the participating agencies. If monitoring the nursing programme is done properly there is a every possibility of a potentially viable sick industry back to health.

2.9 **Studies Conducted for Prediction of Industrial Sickness**

Sickness never enters with a bang but creeps in slowly. In financial terms [Bidani; 1982:53], a sick industrial unit initially shows the signs of financial distress starting with short-term liquidity, disturbing the production cycle, progressing to revenue losses and then operating losses and moving in the direction of excessive use of external credit. Finally a stage
is reached when it is overburdened with debts and cannot muster sufficient funds to meet its obligations. A healthy unit may have positive parameters which may become negative gradually. The sickness increases when financial parameters become more and more negative. So, it is more than necessary to foresee the incipient sickness and initiate preventive and curative action.

During the past few decades, sickness in industries, financial institutions and business organizations has become a very thought provoking and obvious off-shoot of the modern jet age industrial society. In response to the rising incidence of business/industrial ill-health or failure, a number of detailed investigations have been conducted both by individual researchers and organizations to identify the causes of sickness and suggest remedial measures. The need to detect the possible symptoms of sickness and to protect the 'safety and soundness' of organizations, to forewarn or prevent the recurrence of failures, was highly felt. As a result, a plethora of studies have appeared in the recent past. In this section the important empirical research studies on corporate failure are reviewed and attempts also being made to show them under two broad approaches, viz., univariate basis and multivariate basis.

2.9.1 Univariate Empirical Studies

Ramser and Foster [1933] were the pioneers of quantitative studies of financial ratios to predict bankruptcy. They analyzed 11 ratios for 173 firms whose securities were registered in the State of Illinois. It was found that the less successful firms and the firms subsequently failed had ratio values lower than the more successful firms. However, two turnover ratios, sales to net worth and sales to total assets exhibited an opposite tendency but, the attributes to this opposite tendency were not well explained.

Winakor and Smith [1935] in their study critically examined a sample of 183 firms which failed during 1923-31. They started the use of financial ratios as a potent tool for predicting financial difficulty. For predicting sickness they used a set of 21 ratios for each of the firms and the mean ratios of the middle half of all the firms were examined to compare the individual
changes, if any, for the whole group of the firms. The study concluded that the ratio of net working capital to total assets (NWC/TA) was the most accurate, reliable and steady indicator of firm’s failure.

**Marwin [1942]** examined the trend of unspecified number of ratios on a sample of 939 continuing and discontinuing firms which failed during the period 1926-36. A comparison was made between industry mean ratios of discontinuing firms and estimated normal ratios and found that the ratios of the discontinuing firms were consistently below the established by the surviving firms. A persistent decline from the estimated normal was also found beginning with the sixth year prior to discontinuance. He concluded that three ratios (i) net working capital to total assets (ii) net worth to total debt and (iii) current ratio were very sensitive predictors of discontinuance of business. Four to five years prior to actual discontinuance, ‘Net working capital to total assets’ ratio was found to be the best single indicator of failure.

**Beaver [1967]**, then an eager young assistant professor of Accounting at the University of Chicago, was the pioneer of the first extensive work and performed one of the classic works to predict corporate failure. He studied the predictive power of 30 different financial ratios and developed a univariate model of corporate failure. He tested each of 30 ratios to find out the relative efficiency to predict its value in discriminating between two sets of data of 79 failed and 79 non failed companies for a period of 5 years prior to failure during 1954-64.

The major findings of the study was that the ratio of cash flow to total debt was the best single predictor of failure because it showed the least percentage of error. This ratio mis-classified 13 per cent of the companies one year prior to failure and the rate of mis-classification was only 22 per cent five years prior to failure. The other five ratios found the greatest predictive value were : (i) net income to total assets (ii) total debt to total assets (iii) working capital to total assets (iv) current ratio and (v) no-credit interval. Beaver also concluded that all the financial ratios have different
degrees of accuracy in predicting failure. His work though pioneering, was consider as having some limitations due to its univariate approach.

2.9.2 Multivariate Studies

To overcome the shortcomings of the univariate models efforts were being made by the scholars to develop multivariate models for corporate failure prediction. The strategy for formulating multivariate models was preoccupied with the selection of few important variables and the calculation of their respective weights on the basis of their significance in defining the event. Some of the important multivariate models on prediction of corporate sickness are outlined below.

Tamari [1966] conducted a study for the first time on multivariate basis on 28 companies in Israel over a period of five years prior to bankruptcy during 1956-65 and compared them with industrial companies as a whole. The results revealed that five years prior to bankruptcy, financial ratios of the companies were lower than those for the industry, and in most cases, some of the ratios showed a downward trend during the study period. Profit trend and equity capital & reserves to total liabilities ratios were given maximum weights relatively showing that those ratios were considered to be the best indicators of failure. One of the important criticisms of Tamari’s study was about the selection of ratios and arbitrary fixation of weights to them.

Prof. Altman [1968] in his ‘Z-score’ model, popularly known as MDA (Multiple Discriminant Analysis) model, tried to improve upon the traditional ratio analysis under the theory that ratios, if analyzed with a multivariate framework, will take on greater statistical significance than the common technique of sequential ratio comparisons. In simple words, when several financial ratios are combined, they provide the best predictive ability as compared to the best single predictor of failure.

33 bankrupt and 33 non-bankrupt firms were considered to analyze the problems of corporate bankruptcy in the United States. Out of a set of
22 ratios examined, the five were found to be the best predictors of bankrupcty and the value of ‘Z’ is calculated on the basis of these five ratios. Finally, he constructed ‘Z score’ by the formula:

\[ Z = 0.012x_1 + 0.014x_2 + 0.033x_3 + 0.006x_4 + 0.010x_5 \]

where

- \( x_1 \) = Net working capital/Total assets (measure of net liquid assets of the firms)
- \( x_2 \) = Retained earnings/Total assets (measure of cumulative profitability over time)
- \( x_3 \) = Earnings before interest and taxes (EBIT)/Total assets (measure of true productivity of firm’s assets)
- \( x_4 \) = Market value of equity/Book value of total debt (measure of how much a firm’s assets can decline in value)
- \( x_5 \) = Sales/Total assets (measure of sales generating ability of a firm’s assets)

\( Z \) = Overall index

(All the above ratios are to be expressed as percentages).

Altman marked the range of ‘Z-score’ between 1.81 to 2.99 for making a classification of companies into the bankrupt and non-bankrupt group. If \( Z \) is less than 1.81, the company is almost certain to fail and if it is more than 2.99, the company is in sound health. He concluded that Z-score of 2.675 was the best cut-off point which maintained minimum mis-classification.

His study attracted wide attention because of low percentage error i.e. only 5 per cent for one year prior to bankruptcy. But, in fact, his classification error jumped to 28 per cent two years before bankruptcy and it reached the absurd level of 71 per cent in the prediction made four years before bankruptcy.

Deakin [1972] used all the 14 ratios, which had been used by Beaver to construct an overall indicator on the lines of Altman’s analysis. He investigated the financial health of 32 failed firms (which experienced either
bankruptcy or were liquidated for the benefit of the creditors) that failed during 1964-70 in the United States and a matching sample of 32 non-failed firms were taken. Each failed firm was matched with a non-failed one on the basis of industry, size and year of financial data. Deakin's original model included 14 ratios and his revised model included only 5 best ratios which could predict corporate failure in each of the five years prior to failure. To convert the results of various ratios into a single summary number, he used a series of letters and signs of plus and minus to communicate the condition and trend of the firm's health. He used different 'letters' to represent the level of the ratios and 'a plus or minus' sign to project the direction of the trend in the ratio.

It was concluded by Deakin that the discriminant analysis can be used to predict business failure using ratios as prediction variables three years in advance with a fairly high degree of accuracy. However, the accuracy declined significantly when validated against a holding sample.

Edmister's [1972] purpose was to develop and test a number of methods of analyzing financial ratio to predict the failure of small business. 19 ratios were tested and he developed 7 variables Zero-line linear regression equation with the use of ratios of a firm divided by its respective industry average and classifying ratios by an quartics. He concluded that the predictive power of ratio analysis depends upon both the choice of analytical method and the selection of ratios.

Blum Marg [1974] developed the 'Failing Company Model' (FCM) to assess the probability of business failure. He used 12 variables mainly divided into three groups: (1) liquidity (ii) profitability and (iii) variability and trends. He evaluated the prediction accuracy of his model by using the discriminant analysis technique applied to a paired sample of 115 failed and 115 non-failed firms. By applying his model, he distinguished failing firms from non-failing firms with more accurately. The accuracy of the model was 94 per cent one year prior to the failure date. The accuracy was 80 per cent when the failure occurred within two years from the date of prediction. Later
until 5 years the prediction rate of the model was approximately 70 per cent.

Libby [1975] analyzed all the 14 ratios used by Beaver and Deakin in their studies to find out the most important ratios. The five variables chosen by him were: (1) Profitability (ii) Activity (iii) Liquidity (iv) Asset balance and (v) Cash position. The five ratios viz. (a) Net income/Total assets (b) Current assets / Total assets (c) Cash/Total assets (d) Current assets / Current liabilities and (e) Current assets / Sales were selected to represent the aforesaid five financial variables. A sample of 63 companies, which failed between 1966 and 1971 were taken and the financial data were obtained for fiscal years ending from 1964 to 1969, was used to comprise the classification ‘failing’ for development of the model.

2.9.3 Empirical Studies in India and Bangladesh

Several studies have made to apply different models to Indian data by some researchers and eminent persons in the field. Some important of these studies and one attempt has made to apply Altman’s model in Bangladesh on prediction of industrial sickness are stated below:

Sarma and Rao [1976] applied Multiple Discriminant Analysis (MDA) to financial characteristics of 60 cotton textile industry members in India. 26 ratios belonging to five categories, viz., liquidity, profitability, leverage, solvency and activity were considered. The analysis revealed that given favourable external factors, the firms' soundness is reflected by its earning power, dividend policy, management of current assets and net worth. The test of predictive accuracy showed that 95 per cent of the firms were classified correctly. The model seemed to be accurate for periods as early as three years to failure.

Satyanarayana [1979] examined the relevance of Altman’s model in the context of the Indian industry. Z-scores were calculated for three particular Indian companies and a group of 486 profit making and 185 non-profit making companies. Considering that high gearing profits before interest and taxes may show opposite trends so, Z* (modified Z-score) were
calculated on profits after interest & before taxes. It was concluded that though the Altman's model was not useful in predicting health of an Indian company, it was helpful to know whether it (a company) was borrowing beyond its capacity. The results showed that the impact of interest was very significant on Z*.

**Kaveri [1980]** attempted to predict the borrower's health by using financial ratios. He developed a multiple discriminant model for predicting sickness in small scale industries from bankers point of view. The data were collected from 524 small units belonging to paper, leather, engineering, textile and chemical industrial groups, covering the period 1967-73. The study considered events as good, irregular and sick. 22 ratios were examined for identifying the health of small scale industries. Of these only 5 ratios belonging to five different categories were selected, ensuring that they possess higher predictive ability and bankers' acceptability. The five ratios are: (i) current assets to current liabilities (ii) stock to cost of goods sold (iii) current assets to net sales (iv) net profit (before tax) to total capital employed and (v) net worth to total outside liabilities. This study achieved 76 per cent classification accuracy at one year advance to sickness which declined gradually with increase in number of years prior to the event. The model projected higher degree of prediction in the short-run than in the long-run. The study suggested that there should be periodic appraisal of the results of the model, should be updated using additional information or by introducing new variable if necessary.

**Srivastava [1981]** used a combination of operational, technical and financial parameters to discriminate between the sick and healthy units. He developed a linear discriminant function comprising of seven ratios for predicting sickness: \( x_1 = \text{Net worth} / \text{Total assets} \); \( x_2 = \text{Net block} / \text{Net worth} \); \( x_3 = \text{Net profit} / \text{Total assets} \); \( x_4 = \text{Total liabilities} / \text{Net worth} \); \( x_5 = \text{Current assets}/\text{Current liabilities} \); \( x_6 = \text{Capacity utilization ratio} \) and \( x_7 = \text{Plant utilization ratio} \). The mis-classification error was 10 per cent when five financial ratios were used. It further reduced to 5 per cent when first three financial ratios were combined with technical and operational ratios.
The model developed by using all the seven variables had a predictive accuracy of almost 100 per cent.

**Bhattacharya [1982]** attempted to develop a model using multiple discriminant analysis in order to identify the different symptoms which explain the sickness phenomena, their relative contribution in determining the extent of sickness. He selected 28 sick and 26 healthy companies and constructed two sets of model for the study. He claimed his first model superior to the second one on the basis of less number of sick companies mis-classified as healthy companies.

**Bidani and Mitra [1982]** have formulated a clinical model to study and examine the internal and external causes of sickness dividing the functional areas into four namely: finance, production, marketing and personnel. According to them, if there is a certain disorder in any of the functional system within the unit, its health shall be affected. They have suggested some guidelines for correct identification of sick units to remove some of the apprehensions or doubts which might arise in the course of identification. They have stated that the sickness develops gradually and is not an overnight phenomenon. But the financial institutions are usually kept in the dark till the concern enters into a critical stage. The authors emphasized on constant and continuous watch on the transactions in the accounts of borrowers with the banks. It had not gone into the depth of the problem that with the root cause of such problem of sickness in industry.

**Gupta [1983]** attempted to identify the best set of financial ratios which would not only identify potentially sick firms but also order them according to their financial health. He examined both Altman’s model and Beaver’s method for predicting corporate failure and concluded that Beaver’s method would be more suitable for predicting a practical forewarning system. He studied the predictive power of 56 financial ratios grouped into two broad categories and revealed that profitability ratios are relatively more potential than balance sheet ratios in predicting the corporate health status. The current ratio, for example, showed an average classification error almost three times
greater than profitability ratio in case of textile companies. Among the balance sheet ratios, he found that the ratio of net worth/total debt and all outside liabilities/tangible assets had the least classification of error. His study showed that the following five ratios had the highest predictive value and the least classification error when applied to homogeneous industry groups: (i) EBDIT/Net sales (ii) OCF/Net sales (iii) EBDIT/Total assets plus accumulated depreciation (iv) OCF/Total gross assets (v) EBDIT/Interest + 0.25 Debt.

He applied all the above mentioned ratios on a sample of 38 sick and 42 non-sick units from 41 textile and 39 non-textile companies during 1962-74 and remaked that among the above mentioned ratios, first two are the best ratios of about equal merit. The classification of error for the two best ratios was 11 to 13 per cent in 1962 and about 8 per cent in 1964 which further declined over the years. In other words the accuracy increased gradually.

Srivastava and Yadav [1986] collected data from the financial statements of sick and non-sick companies belonging to the private manufacturing sector, one to six years prior to the event. A sample of 39 non-sick companies and 39 sick companies which became sick during 1966 to 1980 was classified according to industry and size, measured by the paid-up capital employed. A set of 36 financial ratios were selected representing profitability, solvency, liquidity and turnover ratios. The univariate as well as multivariate factor and discriminant analysis were adopted. The discriminant analysis included 15 variables. Profitability and turnover ratios emerged to be significant discriminators. The model gave encouraging results for two year prior to failure. It was observed to predict well for short period. When tested on a validity sample including textile companies, it was found to predict sickness very accurately upto six years prior to the event. Next, some non-financial ratios like capacity utilization and production cost were also used for predicting sickness in nine industry groups, with a predictive reliability of 95 per cent. This indicated that the Z-score method is fairly reliable.
indicator of the state of health of industrial units.

Mahmood and Bhattacharya [1989] in their study examined the applicability of some ratios to predict the financial health of industrial enterprises in Bangladesh. They selected 23 public sector enterprises under Bangladesh Chemical Industries Corporation (BCIC) for the study and tested five best predictive ratios identified by Prof. Altman and some other financial ratios for prediction of financial health of selected enterprises and found them as having a higher rate of predictive value. They also found that Z-score of profitable enterprises was higher than that of losing enterprises.

Joshi and Ramani [1991] attempted to identify a set of significant financial ratios for controlling the company level performance in the paint industry, as reflected in higher profitability and productivity. To achieve this objective, a list of seven companies in the paint industry was selected and the data on 27 financial ratios were obtained for the period of 1981 to 1987 from the Bombay Stock Exchange Directory. The results of the multiple discriminant analysis showed that good performance of the paint industry depend on liquidity management and sales turnover.

Panigrahy and Mishra [1993] made an attempt to design a cash flow variable model to predict corporate sickness. In their study, a sample of 45 sick and 45 non-sick companies was selected. The sample of sick companies in which sickness was reported between the period 1977-87 was drawn at random from 12 different industry groups. The MDA was applied as an appropriate statistical technique under the multivariate analysis. Besides this, scaled vector technique, t-test and multivariate F-test were also used. Based on the 't' and 'F' values, altogether 14 cash flow ratios, seven each from Traditional Cash Flow (TCF) and Operating Cash Flow (OCF) groups, were found statistically significant. Later, when multivariate F-test was applied to each of the MDA models, the OCF model was rejected because it was not statistically significant. Finally, they selected seven ratios of TCF group were: (i) TCF/Total assets (ii) TCF/Total liabilities (iii) TCF/Net sales (iv) TCF/Net worth (v) TCF/Current assets (vi) TCF/Current liabilities
and (vii) TCF/Total capital. Putting the actual values of variables in the discriminant equation, a score known as the Y-score is finally obtained.

\[ Y = 4.99x_1 - 13.97x_2 - 1.87x_3 - 0.12x_4 + 0.76x_5 + 2.28x_6 + 1.24x_7 \]

The cut-off point for Y-score value was determined at -0.4221. Based on this cut-off point, the classification accuracy of the model one year prior to sickness was estimated at 86.67 per cent. The classification accuracy rate decreased from the second year to fifth year i.e. 85.56, 79.89, 75.56, 62.22 per cent respectively prior to sickness. Their concluding remark was that cash flow ratios have a higher rate of accuracy in predicting as well as signalling corporate sickness in advance.

In a recent attempt Rameshan [1996] has attempted an exploratory analysis of the change in the financial health of selected public enterprises based on multiple discriminant analysis by using separately the discriminant variables of Robertson and Altman. The study covered a sample of 20 public sector non-departmental & non-financial enterprises. Ten of these enterprises were the profit leaders as per the Public Enterprise Survey 1992-93 whereas the other ten the loss leaders in the same year. The analysis carried out for a period of seven years, viz. 1987-88 to 1993-94. The four years of the study fall in the pre-liberalisation period while the last three years have witnessed the liberalisation drives. He found that there has not any dramatic improvement in financial health during liberalisation years. In fact, the multiple discriminant co-efficients have implied deterioration in most cases. Even in the case of the ten profit leaders, the financial health went down during the last three years of the study. His concluding remark was that at least in the first three years of liberalisation, no break-through has achieved by the major public enterprises in areas of efficiency or overall financial strength. Actually, this attempt of the author was in view of the experimental nature of work. He mentioned that the analysis can be extended to all non-departmental production enterprises operating with a profit or loss record. The author has a plan to continue more and more research on this line.
2.9.4 A Critical Evaluation of the Studies

The studies conducted before 1960 were quite useful in analyzing and predicting the financial difficulties of business but none of them found the desired accuracy and perfection to the model because (i) Ramser and Foster covered in their study a large sample of 173 firms and their two turnover ratios had exhibited an opposite tendency; (ii) Winakor and Smith had studied a big sample of 183 firms but they did not cover the successful firms. They analyzed the data of unsuccessful or likely to be unsuccessful firms only; (iii) Marwin tried an unspecified number of ratios on a very large sample of 939 firms.

The shortcomings of these studies can be ignored while considering the importance of their contribution in the development of financial ratio analysis as a potent tool for predicting the business difficulties. Moreover, the ratios which they had chosen as their best ratios are still credible. Undoubtedly, Beaver's contribution on empirical findings to the failure prediction is a commendable job particularly, the accounting data have shown the ability to predict failure for at least five years prior to failure. His work though pioneering, has criticized on the ground that the work is based on univariate approach, but in reality it set the stage for the multivariate attempts by others.

Tamari conducted a study on multivariate basis for the first time. The main criticism against his study is that he had chosen ratios and fixed the weights to them on arbitrary basis. Not only this, the study is not supported by any conceptual or empirical evidence. Altman made a significant breakthrough in the area of corporate bankruptcy prediction by developing Z-score model popularly known as MDA model. He developed the Z-score model based on the theory that ratios, if analyzed with a multivariate framework, will take on greater statistical significance than the common technique of sequential ratio comparison. This idea made him famous. The most remarkable shortcoming of Altman's model is that it tends to be accurate only for the year before the corporate bankruptcy i.e. the model did not give more accuracy when the lead time increases. This shortcoming of the model has
decreased its practical utility to predict corporate bankruptcy. Beaver's method is certainly more reliable than Altman's because of the less percentage of error on prediction of corporate failure.

Deakin's study on firm's failure attempted to develop an alternative model to the same developed by Altman and Beaver. He used all the 14 ratios of Beaver and obtained improved predictability up to 3 years prior to failure (average 5 per cent) but in the fourth and fifth year prior to failure error rates increased to 21 per cent and 17 per cent respectively. Later, some other researchers like Edmister, Blum Marg, Libby conducted studies by using the technique of multiple discriminant analysis (MDA) to improve upon the earlier studies. No doubt, all these studies have shown a significant rate of accuracy for the prediction of business failure but a common limitation is that all these studies have a separate discriminant function for each of the 5 years before failure. For this limitation, it is difficult to know which particular discriminant function is to be applied in a particular case. Though the studies, conducted in the western world, have unearthed the fact that financial ratios have the ability to predict the survival or failure of business firms but there have no similarities in ratios or combination of ratios perform well.

All the univariate and multivariate empirical studies discussed earlier, can not be apply to the industries of India and Bangladesh verbatim, because of certain difference in basic concepts. In most of the empirical researches, on prediction of firm failure conducted in the western world, firm failure has been synonymous with bankruptcy, which is not correct. Bankruptcy is a legal term which means insolvency but a large number of industries do not close their business operations even after several years of continuous losses. They run their business despite accumulated losses, with the help of financial assistance from commercial banks and financial institutions. Actually, bankruptcy is the culmination of failure i.e. a firm may fail and yet can remain far away from bankruptcy. Therefore, failure of a concern can be regarded as sickness whereas bankruptcy is to be considered as its last ritual.
In a pioneering attempt Kaveri conducted a study on prediction of sickness in small scale industries. The study has given 76 per cent classification accuracy prior to one year of sickness. Srivastava developed a linear discriminant function comprising of seven ratios to discriminate between the sick and healthy units. Bhattacharya also has done studies by using multiple discriminant analysis. Bidani & Mitra developed a clinical model of the anatomy of an industrial unit. Gupta identified a set of financial ratios to monitor the sickness of an industrial unit. Without these, few attempts have been made to apply different models to Indian data by Sarma & Roa, Satyanarayana, Srivastava & Yadav, Joshi & Ramani, Panigrahi & Mishra, Rameshan and also some other eminent persons in the field.

Only one study on prediction of industrial sickness has carried out in Bangladesh though the sickness in this country has posed serious threat to the national economy. Existing financial models should be modified to suit the industrial data of Bangladesh. So more and more studies are essential to calculate those financial ratios which are more relevant to our criteria for detecting the industrial sickness.
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